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ABSTRACT

This report presents a methodology for examining perceptual development in the arts and describes a study based on this methodology. The purpose of the study was to chart the developmental course of perceptual skills used in the arts and to investigate whether these skills generalize across art forms and aesthetic properties or whether they are specific to the art form and/or property to which they apply. The sensitivity of 7-, 9-, and 12-year-old children to the aesthetic properties of repleteness, expression, and composition was investigated in the art forms of drawing, music, and literature. The stylistic properties manipulated in sensitivity tasks were, in drawing, thickness and texture of line; in music, articulation, timbre, and dynamics; in literature, meter, rhyme, and similes. Sensitivity to aesthetic properties was shown to develop between 7 and 9 years of age. Ability to perceive aesthetic properties in one art form did not predict ability to perceive these same properties in another art form. Likewise, ability to perceive one aesthetic property did not predict ability to perceive another aesthetic property in the same art form. These results were seen to indicate that very young children do not attend to aesthetic properties of adult art and that aesthetic perception develops property by property and domain by domain. It was suggested that aesthetic perception appears to emerge as not one skill but as many. (Author/RH)

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Children's Perception of "Aesthetic" Properties of the Arts: Domain-Specific or Pan-Artistic?

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Abstract

A methodology is presented for examining perceptual development in the arts and a study based on this methodology is reported. The purpose of the study was to chart the developmental course of perceptual skills used in the arts and to investigate whether these skills generalize across art forms and aesthetic properties or are "art-form-specific" and/or "property-specific."

Seven, 9, and 12 year olds' sensitivity to three aesthetic properties (repleteness, expression, and composition) was investigated in three art forms (drawing, music, and literature). Sensitivity to aesthetic properties was shown to develop between 7 and 9 years of age. Ability to perceive aesthetic properties in one art form did not predict ability to perceive these same properties in another art form (supporting the "art-form-specific" position). Likewise, ability to perceive one aesthetic property of an art form did not predict ability to perceive another aesthetic property in the same art form (supporting the "property-specific" position). These results suggest that very young children do not attend to aesthetic properties of adult art works and that aesthetic perception develops property by property, and domain by domain. Aesthetic perception appears to emerge as not one skill but many.

Children's Perception of "Aesthetic" Properties of the Arts: Domain-Specific or Pan-Artistic?

Over the past two decades, a great deal has been learned about the development of "basic-level" symbolization in young children (Wolf, 1979). By basic level symbolization, we refer to the understanding that one element stands for, or refers to, another element. During the first few years of life, children come to learn, for instance, that words refer to objects in the world; that marks on a two-dimensional surface refer to three-dimensional objects; and that one object can be used in play to stand for an imagined object.

Understanding reference and representation is the scaffolding upon which all symbol use rests (Goodman, 1976). While a considerable body of knowledge has been acquired about this first-draft understanding of symbolization, very little is known about how children become sensitive to aesthetic, non-referential aspects of symbol use.

In what follows, we describe a new methodology designed to investigate children's ability to perceive "aesthetic" properties of symbols. Sensitivity to three aesthetic properties was investigated in each of three symbol systems. The three aesthetic properties examined were repleteness (to be defined), expression, and composition; the three symbols systems examined were drawing, music, and literature.

This study is part of an ongoing program of research on aesthetic development, and presents the first picture of the relationship among perceptual abilities in the arts. The research was designed to address three broad questions: (1) When do children become able to perceive aesthetic properties of symbols? Is this skill early to develop, as is basic-level symbolization, or is it a relatively late acquisition? (2) Is the ability to perceive aesthetic properties a general skill, cutting across art forms? That is, does sensitivity to expression (for example) in one art form predict sensitivity to expression in another art form, or is this ability one that is "art-form-specific?" (3) Is the ability to perceive an aesthetic property of a given art form related to the ability to perceive other aesthetic properties of that same art form? That is, is there a general aesthetic sensitivity skill within an art form, or is such sensitivity "property-specific?"

To ask when children begin to perceive aesthetic properties of symbols, one must attempt to delineate the distinction between aesthetic and non-aesthetic ways of symbolizing. One might easily make the mistake of confusing aesthetic symbolization with particular symbol systems. Thus, one might argue that whenever a child draws a picture or hums a tune, this behavior constitutes a case of aesthetic symbolization. The problem with this solution becomes apparent when one considers the case of language. Clearly, ordinary usage of language does not count as aesthetic: a distinction is usually made between ordinary

language use and the ways in which poets use words, even though the criteria for this distinction are difficult to articulate. It is argued here that the same distinction can be made in the case of other symbol systems.

According to Goodman's (1976) path-breaking analyses of artistic symbolization, no symbol is inherently aesthetic or non-aesthetic. A symbol can function non-aesthetically or aesthetically, depending on how it is "read" by the perceiver. We argue that when a symbol functions aesthetically, three properties of the symbol are highlighted: repleteness, expression, and composition.

Repleteness: To illustrate what is meant by each of these properties, consider Goodman's (1976) example of a zig-zag line. If such a line is part of an electro-cardiogram, all that is important to notice are the referential aspects of the line -- its peaks and dips relative to the abscissa and the ordinate. The line is thus functioning as a scientific symbol. But if this zig-zag line delineates the edge of a mountain range in a landscape drawing, a number of other physical apsects of the line besides its contour become important to notice: e.g., variations in the thickness of the line, its color, its texture, etc. All of these aspects are constitutive of the meaning of the line and should not be ignored. It is for this reason that when the line is functioning aesthetically, it cannot be translated: altering the color, thickness, or texture of the line yields a different symbol. In contrast, when the line is

functioning as an electro-cardiogram, it is readily translatable. That is, if one changes the color, or translates the line into a series of numbers, no information is lost. The property of aesthetic symbols whereby relatively many physical aspects of the symbol contribute to its meaning is referred to here as repleteness (Goodman, 1976).

Expression. When the zig-zag line is functioning as an electro-cardiogram, it conveys meaning by denoting what it refers to. In the same way, a stop sign denotes the command to stop, and a "Y" on a road sign denotes a fork in the road ahead. When a symbol functions aesthetically, it is not only important to notice what it literally denotes or represents (i.e., stands for), but also what it expresses metaphorically. A line in a drawing may be described as fierce, calm, joyful, anguished, heated, ripe, etc. Such descriptions are of course metaphorical. Moreover, lines on maps and graphs cannot be referred to in this way. It is only when a symbol is functioning aesthetically that it symbolizes by metaphorical expression of properties that it does not literally possess (Goodman, 1976).

Composition. When the line is part of a landscape drawing, one attends to the organization of the line on the page -- whether it is balanced in some way (not necessarily through symmetry) or whether it is unbalanced, yielding an impression of lack of resolution (Arnheim, 1976). We refer to this property as composition. Of course, all pictures, including electro-

grams, have a composition. However, in a work of art, the composition is part of the meaning of the work, contributing perhaps most importantly to its expression. Hence it is more important to attend to composition when a symbol is functioning aesthetically.

The logic of this approach leads to the conclusion that no symbol is inherently scientific, pragmatic, aesthetic, etc. Whether a symbol functions aesthetically depends on the attitude that the perceiver adopts, on what he chooses to notice. Even a found object such as a rusted piece of machinery can function as an aesthetic symbol, provided that one attends to its repleteness, expression, and composition. But if one attends only to the object's literal meaning -- e.g., pragmatically, what the piece of metal actually used to be -- then the object is not functioning as art.

The three properties argued to be central to works of art manifest themselves in all forms of art. For instance, language becomes replete when one attends to sound qualities, meter, sentence structure, etc; through connotation, words can express properties that they do not literally denote; and when a linguistic text is functioning as art, it is characterized by a well-organized composition through which some form of resolution is ultimately achieved. Similarly, musical sound becomes replete when one attends to properties such as articulation, dynamics, timbre, etc; musical sound can express moods and other non-auditory properties such as heat and cold; and

when sound is used to make music, it is characterized by a composition in which tension that has been built up is eventually resolved. It is only to the extent that the perceiver attends to these three properties that he can be said to be perceiving a symbol as an aesthetic symbol.

One cannot determine when children become sensitive to aesthetic properties of symbols by examining the kinds of art works that are produced at various ages. For instance, although preschool drawings have often been described by artists as expressive, playful, and balanced (e.g., Gardner, 1980; Winner, 1982), we cannot conclude that these properties were intentionally produced by the child. Nor can we assume that the child even perceives the properties that the adult perceives in his drawings.

To investigate children's sensitivity to aesthetic properties of symbols, we constructed a set of perceptual tasks. By administering the tasks to children of different ages, we sought to pinpoint the emergence of sensitivity to aesthetic properties. To the extent that young children prove blind to aesthetic properties, the aesthetic properties that we perceive in children's art work cannot be assumed to be intentionally produced.

Through the construction of parallel tasks in three art forms -- drawing, music, and literature -- it is possible to determine the degree to which sensitivity to a given aesthetic property generalizes across art forms or is "art-form-specific."

This methodology allows one to ask, for instance, whether sensitivity to repleteness in drawing predicts sensitivity to repleteness in music and/or literature. If sensitivity to aesthetic properties is "art-form-specific," then one cannot assume that there is such a thing as a general aesthetic sensitivity that cuts across the arts.

We also examined the relationship among the abilities to perceive the three aesthetic properties within a given art form. That is, does level of sensitivity to repleteness in drawing predict level of sensitivity to expression and/or composition in drawing? If sensitivity to each property is independent of sensitivity to other properties within the same art form, instead of speaking about skills such as "sensitivity to music," one must speak of the more specific skill of "sensitivity to expression in music," etc. There is some empirical evidence to suggest that sensitivity to an art form may develop property-by-property: Wolf and Gardner (in preparation), for instance, report that in very young children, sensitivity to pitch relations in music may occur without comparable sensitivity to rhythm, and vice versa.

We have used some of the tasks previously to examine sensitivity to a particular aesthetic property as it manifests itself in a particular art form. For instance, we examined sensitivity to repleteness in drawing (Winner, Blank, and Gardner, 1983), music (Davidson, Gardner, and Winner, 1983), and literature (Massey, Gardner, Blank, and Winner, 1983), as well as sensitivity to expression in drawing (Blank, Massey, Gardner, and

Winner, 1984) and music (Davidson, Gardner, and Winner, 1983), and sensitivity to composition in literature (Rosenblatt, Massey, Gardner, and Winner, 1985). These studies were carried out to investigate the fine structure of sensitivity to an aesthetic property in a given art form. For instance, we investigated the kinds of compositional principles most easy and difficult to perceive in literature, the kinds of repleteness properties most and least readily perceived in drawing, etc. While a great deal of information was gained from these studies about perceptual abilities in different art forms, information about the relationship among art forms and among aesthetic properties could not be provided by these studies. The purpose of the present study was to provide such information.

Every effort was made to design tasks of comparable difficulty level. That is, we tried to design tasks that were of equal difficulty across art forms (drawing, music, and literature) as well as across aesthetic properties (repleteness, expression, and composition). It is, of course, always possible to construct extremely difficult repleteness tasks and extremely easy expression tasks, or very difficult drawing tasks and very easy music tasks, etc. But if the tasks differ in level of difficulty, it would be risky to draw conclusions about either domain- or property-specificity. For instance, if tasks in one art form were more difficult than those in the other art forms, there might be a floor effect. If this occurred, a child who performed well on an easy task might fail at the difficult

task. From this one might conclude that there was no relationship between skills in the two art forms when in fact a relationship might have been discerned had the tasks been comparable. The same problem would occur if the tasks assessing one aesthetic property were more difficult than tasks assessing the other properties. Moreover, any interaction between art form and aesthetic property would be rendered uninterpretable since we could not determine if this were due to arbitrary differences in task difficulty or to a genuine interaction.

Since there is no definitive a priori way of assessing task difficulty, we had to rely on pilot testing to determine that the tasks were comparable. However, only subsequent statistical analyses could reveal for sure whether in fact our tasks were comparable. As will be discussed below, MANOVAs demonstrated that indeed our tasks were equal in average difficulty level.

Method

Subjects. Ninety children at each of ages 7, 9, and 12 were randomly selected from public school classrooms in the Boston area. Half of the subjects at each age came from lower middle class neighborhoods and half came from upper middle class neighborhoods. Subjects were equally divided between males and females.

Materials and Procedure. Nine sets of tasks were constructed by crossing three art forms (drawing, music, literature) with three properties (repleteness, expression, composition).

Stimuli were adapted from art works by adult artists. In the repleteness tasks, children were presented with an incomplete work (a black and white line drawing with a portion missing, a fragment of a melody, a fragment of a story or poem) and were asked to select from two choices the one which was drawn/played/written in the same way. One completion violated a stylistic property; one completion (the artist's actual completion) maintained the stylistic properties of the target.

Of course any number of stylistic properties could have been chosen for investigation of sensitivity to repleteness. We made the following choices, based on the previously mentioned studies investigating each art form separately. The stylistic properties manipulated in drawing were two different qualities of line: thickness and texture. In music, the stylistic properties manipulated were articulation, timbre, and dynamics. In literature, the stylistic properties manipulated were meter, rhyme, and similes (present vs. absent). We reasoned that if a child perceived the drawing, music, or story fragment as an aesthetic object, then he or she should notice these stylistic properties and recognize them to be relevant to the work. Hence, the child should select the continuation that maintained these properties. If the child selects at random, we can conclude that he or she is not attending to, or does not deem important, the stylistic properties in question. We could conclude that the child was not perceiving the work as replete. (See Tables 1-3 and Figures 1-3 for descriptions and examples of repleteness items.)

Tables 1-3 and Figures 1-3 about here

In the expression tasks, children were presented with a target work (a reproduction of a painting or drawing, a brief segment of music, a portion of a story or poem) clearly expressing either a happy, sad, calm, or excited mood (as determined by adult raters) along with two other works in the same art form. One choice expressed the same mood as the target; the other expressed the opposite mood (as determined by adult raters). Children were asked to think about the mood shown in the target work and to select from the two choices the one expressing a similar mood. We selected two polar pairs of moods to investigate: happy vs. sad, and excited vs. calm. We selected these because most works of art can be described along one or both of these dimensions; moreover, distinctions between these moods are ones that ought to be made by very young children. In the drawing tasks, the moods were conveyed by properties such as color, line, and composition. In the music tasks, the moods were conveyed by tempo and mode. In the literature tasks, the moods were conveyed by semantic connotation. Never were the mood terms used in the literature fragments, nor did the fragments contain descriptions of people displaying the relevant moods. Instead, mood was conveyed by the connotation of words used to describe scenes. (See Tables 4-6 and Figures 4-6).

Tables 4-6 and Figures 4-6 about here

In the composition tasks, children were presented with an incomplete work (an incomplete graphic design, a melody or story without an ending) along with two possible completions, each consisting of the original target plus an ending. Children were asked to choose the completed work that looked/sounded the best. In the drawing task, the inappropriate completion yielded pictures which were unbalanced; the appropriate completion was balanced. In only one of the six drawing composition items was the appropriate completion balanced through simple symmetry. In the remaining items, balance was achieved by asymmetrical placement (as in Figure 7) or by color proportion. For instance, a small patch of bright color is perceived as heavy because of its brightness and thus can be counterbalanced by a larger portion of a duller color (Arnheim, 1974). In the music tasks, a resolution in composition was achieved by returning to the key of origin, making the final phrase symmetrical in length to the opening phrase, or by continuing the motive or figure of the melody (as in Figure 8). In the literature tasks, a resolution was achieved by resolving the story conflict (as in the item in Figure 9) or returning to a motif with which the story opened. (See Tables 7-9 and Figures 7-9).

Tables 7-9 and Figures 7-9 about here

During the task construction phase, all items were administered to at least ten adults. Only those items for which adults selected the "correct" choice 90-100% of the time were used. These items were then administered to 7, 9, and 12 year olds

serving as pilot subjects. Items which yielded scores (averaged across ages) of around 50% (chance) or around 100% (ceiling) were omitted since they were considered to be either too difficult or too easy and hence would not reveal individual differences.

In the study proper, fifteen subjects at each age were randomly assigned to one of six conditions. In each condition, subjects received three tasks. In Conditions 1-3, subjects received tasks assessing sensitivity to one aesthetic property in each of three art forms (e.g., repleteness in drawing, music, and literature). In Conditions 4-6, subjects received tasks assessing sensitivity to each of three aesthetic properties in one art form (e.g., repleteness, expression, and composition in music). (See Table 10 for a description of each condition.) This design allowed us to address the three questions stated above. (1) An analysis of age trends across all six conditions addressed the question of when children become sensitive to aesthetic properties, as assessed by our tasks, and hence whether this sensitivity emerges relatively early or late in development. (2) Conditions 1-3 allow a within-subjects comparison across art forms for each aesthetic property. This addresses the question of whether sensitivity to a particular aesthetic property generalizes across art forms or is "art-form-specific." (3) Conditions 4-6 allow a within-subjects comparison across aesthetic properties for each art form. This addresses the question of whether aesthetic sensitivity to a particular art

form generalizes across aesthetic properties or is "property-specific."

Table 10 about here

Each child was seen individually for 1-3 sessions lasting 20-45 minutes each. Session length and number depended on condition; literature and music tasks took longer to administer. One practice item was included at the beginning of the literature and music tasks because of the more complex instructions due to the "temporal" nature of the tasks. Order of presentation of tasks in all conditions was randomized and counterbalanced across subjects. All literature items were presented on audiotape in order to standardize speed, clarity, and intonation. Intonation was kept neutral in the literature expression items so that the expressed meaning was conveyed by the words themselves and not by how they were spoken. The literature tasks were presented orally rather than in written form because this is the way that young children first encounter literature and because a task in written form could not have been used for the 7-year-olds due to reading ability limitations.

Results

Table 11 presents the mean scores for all conditions. The highest possible score for any task was 6. To determine which scores were above chance level, a t-test was performed comparing the observed mean scores vs. 3.0, the level expected by chance. On Table 11, scores that are significantly above chance ($p<.01$) are asterisked. Because of the design of the study, each

task was administered twice (e.g., drawing repleteness in Conditions 1 and 4). Thus, each task is replicated once. We examined when scores exceeding chance were replicated (i.e., when children could exceed chance on both administrations of a particular task). This analysis revealed that seven year olds performed at chance level on every task except the music expression task. Nine year olds performed at chance level on all three kinds of repleteness tasks (drawing, music, literature) and on literature expression. Twelve year olds performed at a level above chance on all but the literature expression task. This indicates that the aesthetic properties in question, as assessed by our tasks, are not immediately perceptible to seven or even to nine year olds.

Table 11 about here

However, inspection of the means reveals that even the chance level scores tend to be above 3.0 more often than below 3.0. This suggests that even when scores were not significantly above chance, children were not guessing on every item. In fact, as will be shown below, the chance level scores were high enough to prevent a main effect of art form (with music as the easiest form to perceive) as revealed by MANOVA.

A repeated-measures MANOVA was performed on the correct scores in Conditions 1-3, with four between-subjects factors, Age (3), Aesthetic Property (3), SES (2), Sex (2), and one within-subjects factor, Art Form (3). Significance level was set at $p<.01$. There was a main effect of Age, $F=25.33$, $df=2,100$,

$p<.001$. As determined by post-hoc Tukey tests ($p<.01$), this occurred because the 7-year-olds' scores were lower than those of both 9-and 12-year-olds, while there was no difference between the scores of 9-and 12-year-olds. A main effect of Aesthetic Property approached significance, $F=4.46$, $df=2,100$, $p=.014$. This finding occurred because the mean scores for composition were slightly higher than those for repleteness, which in turn were slightly higher than those for expression. As discussed above, the tasks had been designed in an effort to equalize difficulty levels across aesthetic properties. Differences in difficulty across aesthetic properties would create a serious problem in interpreting our results. However, the differences found here were too small to reach significance in a post-hoc Tukey comparison of means test. Moreover, as will be seen below, in a second MANOVA in which Aesthetic Property was treated as a within-subjects factor, no difference was found between the three properties. Since between-subjects comparisons are always more revealing, we feel that we can safely conclude that our tasks assessing sensitivity to the three aesthetic properties were roughly comparable in difficulty level across subjects.

Finally, there was a main effect for SES, $F=7.65$, $df=1,100$, $p=.007$. This occurred because subjects from upper middle class schools performed at a higher level than those from lower middle class schools. There were no main effects for Sex or for Art Form. Art Form interacted with Aesthetic Property, $F=12.03$, $df=4,200$, $p<.001$. As determined by Tukey post-hoc comparisons of

means ($p<.01$), subjects in Condition 2 (who received the three types of expression tasks) achieved lower scores on the literature tasks than on either the music or drawing tasks. There was no difference between their performance on the music and drawing tasks. Thus, perceiving expression in literature appears to be significantly more difficult than perceiving expression in drawing or music. There was no difference among tasks in the three art forms for subjects in the Repleteness group (Condition 1) or the Composition group (Condition 3).

An identical MANOVA was performed on correct scores in Conditions 4-6. This analysis provides a partial replication test of the previous analyses. The only difference between the two analyses was that in the first analysis, Aesthetic Property was a between-subjects factor and Art Form was a within-subjects factor, while the reverse obtained for the second analysis. Thus, the first MANOVA allows a stronger test of the "art-form-specific" hypothesis, whereas the second MANOVA allows a stronger test of the "property-specific" hypothesis.

Four findings in the first MANOVA were replicated by the second MANOVA. There was a main effect of Age, $F=14.77$, $df=2,99$, $p<.001$, with 7-year-olds performing at a lower level than both 9- and 12-year-olds (as determined by post-hoc Tukey tests, $p<.01$). There were no effects for Sex or Art Form. Art Form interacted with Aesthetic Property, $F=4.44$, $df=4,198$, $p=.002$. When post-hoc Tukey tests were performed on within-subjects comparisons between means (i.e., comparing repleteness, expression, and composition

tasks in music), no significant differences were found at $p<.01$. However, when the significance level was reduced to $p<.05$, the literature expression task was found to be more difficult than the literature composition task. When the tests were performed on between-subjects comparisons between means (i.e., comparing expression scores in each art form), the literature expression task proved more difficult than the music expression task ($p<.01$). Thus, taken together with the first MANOVA, results converge to indicate that expression in verbal texts is particularly difficult for children to perceive.

Two findings of the first analysis were not replicated in the second analysis. First, SES was not significant, although this factor approached significance ($p=.017$), with the upper-middle class population again performing at a higher level. And second, there was no effect of Aesthetic Property. That is, repleteness, expression, and composition tasks (scores summed across art forms) did not differ in difficulty. Since Aesthetic Property served as a within-subjects factor in the second MANOVA, this result should replace the between-subjects effect of Aesthetic Property yielded by the first analysis.

The MANOVAs revealed that sensitivity to these aesthetic properties is not present in very young children, as even 9 and 12 year olds had difficulty perceiving some of them. The analyses also revealed that sensitivity to at least one property -- expression -- is more difficult in literature than in other art forms.

How general a skill is aesthetic sensitivity? In order to test whether aesthetic sensitivity is "art-form-specific" and or "property-specific," relationships among scores across art forms (for each aesthetic property considered separately) and among scores across aesthetic properties (for each art form considered separately) were examined. To this end, Pearson R correlations were computed for each condition.

To address the issue of art-form specificity, correlations were computed for Conditions 1-3. With significance set at $p<.01$, only one out of nine possible correlations reached significance: drawing repleteness scores correlated with music repleteness scores, $r=.41$, $p=.003$ (Condition 1). With significance level set at $p<.05$, two other correlations were significant: music expression and literature expression, $r=.29$, $p<.025$ (Condition 2); and drawing composition and literature composition, $r=.30$, $p=.02$ (Condition 3). These results reveal no consistent pattern. With respect to repleteness, drawing and music correlated; with respect to composition, drawing and literature correlated; and with respect to expression, music and literature correlated. Not only did no pattern emerge, but the correlations found were quite modest. In the case of repleteness, the correlation between drawing and music accounts for only 17% of the variance; in the case of composition, the correlation between drawing and literature accounts for only 9% of the variance; and in the case of expression, the correlation between music and literature accounts for only 8% of the

variance. Thus, the correlational analyses failed to demonstrate strong interconnections among any art forms, despite the fact that aesthetic property was held constant. These findings provide support for the "art-form-specific" position.

To address the issue of generality within art form across aesthetic property, correlations were computed for Conditions 4-6. With significance set at $p<.01$, no correlations proved significant. With significance reduced to $p<.05$, three correlations proved significant: for the drawing tasks, repleteness and expression scores were correlated, $r=.29$, $p=.027$ (Condition 4); for the music tasks, repleteness and expression scores were also correlated, $r=.32$, $p=.016$ (Condition 5); and for the literature tasks, repleteness and composition scores were correlated, $r=.30$, $p=.023$ (Condition 6). Once again, these results display no consistent pattern, and the correlation levels were very low. In the case of drawing, the correlation between repleteness and expression accounted for only 8% of the variance; in the case of music, the correlation between repleteness and expression accounted for only 10% of the variance; and in the case of literature, the correlation between repleteness and composition scores accounted for only 9% of the variance. Thus, the correlational analyses failed to demonstrate strong interconnections across aesthetic properties, despite the fact that art form was held constant. These findings provide support for the "property-specific" position.

The role of formal training. One final issue was addressed in post-hoc fashion after the completion of the study. We investigated whether children who had had formal training in an art form performed better on our tasks than those who had not. We asked each child whether he or she had taken music or art lessons out of school, and if so, for how many years. (We did not ask about literature since extra-curricular literature classes do not exist.) No children had taken outside art classes. However, about a fourth of the children had taken either one or two years of music lessons (65 out of 270 children). Table 12 compares the number of children with and without training who achieved high scores (5 or 6 out of 6) on the music tasks. As can be seen, with the exception of the 7 and 12 year olds on the music expression task, children with training were consistently more likely than those without to achieve high scores on the music tasks.

Table 12 about here

Discussion

Our conclusions are all based on one critical assumption -- the validity of our measures. The measures of aesthetic sensitivity used here were not standardized tests, nor are they the only measures that could have been used. It is certainly possible that other researchers using other measures might find correlations across art forms or aesthetic properties which we failed to find. However, the measures that we have devised were

developed on the basis of what -- in our view -- are the most rigorous and well-thought-out analyses of the nature of aesthetic objects.

The results of this study shed light on four issues: (1) whether aesthetic sensitivity is an early emerging skill; (2) whether aesthetic properties are equally perceivable across art forms; (3) whether aesthetic sensitivity in an individual cuts across art forms; and (4) whether an individual's sensitivity to an aesthetic property in an art form is related to sensitivity to other aesthetic properties within that same art form. We consider each in turn.

(1) While the ability to perceive objects as symbols is an early emerging skill (cf. Wolf and Gardner, in preparation), the ability to perceive objects as aesthetic symbols is a much later emerging ability. The youngest children in this study -- 7-year-olds -- failed to notice aesthetic properties in the art works that they were shown, with the exception of expression in music. Nine and 12-year-olds, however, detected the aesthetic properties investigated most of the time. It is interesting to note that the age group which failed to detect most of the aesthetic properties is the same age group which produces drawings that adults find aesthetically pleasing; the age groups which noticed the aesthetic properties are ages which tend to produce drawings that are highly conventional and hence less aesthetically pleasing (Gardner and Winner, 1982).

What can we conclude about this disparity between perception and production, a disparity which exists at least in the domain of drawing? There are two possible conclusions. It is possible that the perception and production of art follow two divergent developmental routes, with production ahead of perception, at least in some respects. Alternatively, it is possible that the aesthetic properties that adults perceive in children's art works are produced unintentionally; moreover children may remain unaware of the accidentally-produced aesthetic properties of their works. The second explanation is of course the more conservative of the two. We temper this conclusion, however, by suggesting that children may be more likely to attend to repleteness, expression, and composition in their own art works than in the kinds of stimuli used in the present study, adapted from the works of adult artists.

(2) The interaction of Aesthetic Property and Art Form occurred because expression was particularly difficult for all ages to detect when the art form in question was literature. Expression and denotation are the two modes in which an art work may convey meaning. We suggest that the denotational content of verbal texts is so powerful that it virtually drowns out the expressive content. Children simply could not hear the moods conveyed by the connotations of the words, so focussed were they on their denotational content. In contrast, expression in music appears to be easy to perceive. (Recall that this was the only task at which 7-year-olds performed above chance.) The ease of

perceiving expression in music is most probably due to the fact that there is no other mode of symbolism competing for the listener's attention. Music always conveys meaning by expression and only rarely by denotation as well.

The visual arts seem to present an intermediate case. Abstract works function like music -- they express but do not denote. Representational visual works function like literature -- they both express and denote. Our visual items included a combination of abstract and representational works. A comparison of the abilities to perceive expression in the two kinds of works would make it possible to determine whether denotation interferes with the perception of expression. Such an analysis could not be perfomed here because there were too few repleteness items of each type. We speculate that expression should be easier to perceive in abstract than in representational drawings, but that expression should be easier to perceive in representational drawings than in literature. This is because the denotational content of words seems to be more potent (and more overlearned) than the denotational content of pictures. Hence, in the case of language, it should be more difficult to ignore the denotational content and focus on the expressive content.

(3) No strong pattern of correlation was found across art forms, forcing us to conclude that there seems to be no unitary repleteness, expression, or composition sensitivity skills which cut across the arts. Thus, sensitivity to a particular aesthetic property in a particular art form does not seem to depend on any

general principles (e.g., sensitivity to fine detail for repleteness; sensitivity to affect for expression; sensitivity to gestalt principles for composition). Sensitivity to aesthetic properties appears to be highly "art-form-specific."

While it may not be surprising to find that the ability to produce art works is "art-form-specific" (i.e., a person skilled at drawing need not be (and rarely is) skilled at writing), it may be considered surprising to find that the ability to perceive art works is highly specific to the art form in question. Our findings suggest that there is no such entity as aesthetic sensitivity that generalizes across the arts.

(4) Finally, no strong pattern of correlation was found within art forms and across aesthetic properties. Thus, an individual might prove highly sensitive to repleteness in music, but insensitive to composition in music. This suggests both that the properties investigated here are independent of each other, and that the skills required to perceive them are also independent of each other.

In conclusion, the ability to perceive symbols as aesthetic objects appears to develop separately in different art forms. Moreover, the ability to perceive aesthetic properties of symbols develops property by property, even within the same art form Hence, aesthetic sensitivity seems to emerge as not one skill but many.

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Table 1

Sample Drawing Repleteness Task

Target

Black and white line drawing with a portion of the line omitted, mounted on a 9"x12" piece of cardboard.

Correct Choice

Reproduction of the complete drawing, as the artist drew it.

Incorrect Choice

Reproduction of drawing with the omitted portion replaced such that one stylistic property of the line was violated -- either thickness (e.g., lines too thick or too thin) or texture (lines too smooth or too rough).

Procedure

(1) Target is centered in front of child, flat on table.
(2) The two choices are positioned on "easels" directly in front of child, to left and right of target, and placed just behind target.

Instructions

I'm going to show you a picture and a piece of it is going to be missing. (E indicates the empty area.) Then I'll show you two ways to draw the missing piece. I want you to pick the one that is drawn in the same way as the rest of the picture.

Sample Item

See Figure 1.

Table 2

Sample Music Repleteness Task

Target

1-2 phrases from folk tunes set by Brahms, recorded on audiotape from a music synthesizer.

Correct Choice

Continuation of target in same style.

Incorrect Choice

Continuation of target played with one stylistic property altered -- either articulation (e.g., staccato changed to legato), timbre (e.g., flute changed to clarinet), or dynamics (e.g., fixed levels of loudness changed to varying levels).

Procedure

(1) Target is played. (2) Target with either correct or incorrect choice added on is played. An audible click divided target from choice. (3) Target with other choice added on is played, with click dividing target from choice.

Instructions

We're going to listen to some pieces of music today. You are going to hear the first part of a piece of music and then two different ways it might continue, which are called choice A and B. I want you to pick the choice that's played the same way as the first part. We're going to listen to the music on this tape recorder. For each one, you'll hear the first part, then the first part with choice A added on, then the first part with choice B added on. You will hear a click on the last note of the first part so that you will know where it ends and the choice begins. Remember, I want you to pick the choice that's played the same way as the first part.

Sample Item

See Figure 2.

Table 3

Sample Literature Repleteness Task

Target

Fragment of story or poem presented on audiotape.

Correct Choice

Continuation of target in same style.

Incorrect Choice

Continuation of target with one stylistic property altered -- either meter (regular changed to irregular, or the reverse), rhyme (rhyme omitted or added), or similes (similes omitted or added).

Procedure

(1) Target is played. (2) Target is played with either correct or incorrect choice added on. (3) Target is played with the other choice added on.

Instructions

We are going to listen to some pieces of stories today. You will hear the first part of a story and then two different ways that it might continue. I want you to pick the one that's written the same way as the first part. We're going to listen to the stories on this tape recorder. For each one, you will hear the first part and then you'll hear choice A. Then you'll hear the first part again, with choice B. I want you to pick the choice that is written the same way as the first part.

Sample Item

See Figure 3

Table 4

Sample Drawing Expression Task

Target

Picture representing a person clearly displaying a mood of happiness, sadness, excitement, or calm (as determined by adult raters), mounted on a 9"x12" piece of cardboard.

Correct Choice

Slide of abstract projected on screen. Picture expresses the same mood as the target (as determined by adult raters).

Incorrect Choice

Slide of abstract picture expressing opposite mood (as determined by adult raters). E.g., for a "happy" target, a "sad" choice. N.b., if target was in color, choices were in black and white, and vice versa. It was thus not possible to select the correct choice on the basis of similarity in color to the target. Moreover, since the choices were nonrepresentational, it was not possible to select the correct choice on the basis of similarity in content to the target.

Procedure

(1) Target is centered in front of child, flat on table.
(2) Simultaneously, the two choices are projected on small screens placed next to each other on table in front of child.

Instructions

We are going to look at some pictures today. I want you to think about what mood they have. Do you understand what mood means? (Child is asked to give an example. If he/she cannot, or seems uncertain, E provides example of a child fighting during recess and subject is asked to guess what mood the child is feeling. The mood of anger was chosen because it was not one of the "test" moods.) We are going to look at three different pictures. I am going to show you the first one and I want you to think about the kind of mood it has. Then I'm going to show you two more pictures on these two screens. I want you to pick the one that has the same kind of mood the first one had.

Sample Item

See Figure 4.

Table 5

Sample Music Expression Task

Target

Brief fragment of music recorded on audiotape and clearly expressing a happy, sad, excited, or calm mood (as determined by adult raters). A wide range of styles was included: classical, jazz, rock and roll, and folk.

Correct Choice

Fragment of music expressing same mood as target (as determined by adult raters);

Incorrect Choice

Fragment of music expressing opposite mood (as determined by adult raters). The style of both correct and incorrect choices was similar (e.g., both classical, folk, jazz, etc.). Thus, it was not possible to select the correct match on the basis of greater similarity in style to the target.

Procedure

(1) Target is played. (2) Either correct or incorrect choice is played. (3) Other choice is played.

Instructions

We are going to listen to some pieces of music today. I want you to listen to what kind of mood they have. Do you understand what mood means? (Child is asked to give an example. If he/she cannot, or seems uncertain, E provides example of a child fighting during recess and subject is asked to guess what mood the child is feeling. The mood of anger was chosen because it was not one of the "test" moods.) We are going to listen to three different pieces of music. When you hear the first one, I want you to listen carefully to what kind of mood it has. Then listen to the next two, called choice A and choice B, and pick the one that has the same kind of mood that the first one has.

Sample Item

See Figure 5.

Table 6

Sample Literature Expression Task

Target

Fragment of story or poem presented on audiotape. Targets expressed a happy, sad, excited, or calm mood (as determined by adult raters).

Correct Choice

Fragment of story or poem expressing same mood as target (as determined by adult raters).

Incorrect Choice

Fragment expressing opposite mood (as determined by adult raters).

Procedure

(1) Target is played. (2) Either correct or incorrect choice is played. (3) Other choice is played.

Instructions

We are going to listen to some pieces of stories today. I want you to listen to what kind of mood they have. Do you understand what mood means? (Child is asked to give an example. If he/she cannot, or seems uncertain, E provides example of a child fighting during recess and subject is asked to guess what mood the child is feeling. The mood of anger was chosen because it was not one of the "test" moods.) We are going to listen to three different pieces of stories. When you hear the first one, I want you to listen carefully to what kind of mood it has. Then listen to the next two, called choice A and choice B, and pick the one that has the same kind of mood that the first one has. Remember, two pieces might have the same mood even if they are about very different things.

People can read things so that their voice tells you what mood they are feeling. I can make my voice sound angry (E says something in an angry voice); I can make my voice sound sleepy (E says something in a sleepy voice). I don't want to give you any clues about the mood of the story from the sound of my voice, so the stories on this tape are going to be read without any mood at all. (Stories were read in neutral tone of voice.)

Sample Item

See Figure 6.

Table 7

Sample Drawing Composition Task

Target

Incomplete graphic design, mounted on 9"x12" piece of cardboard. Items were made from color-aid paper.

Correct Choice

Completed design with balanced (but not symmetrical) composition.

Incorrect Choice

Completed design with unbalanced composition. E.g., the picture was too crowded on the right side of the page.

Procedure

(1) Target is centered in front of the child, flat on table.
(2) The two choices are then placed on small "easels," one on each side of the target.

Instructions

We are going to look at some pictures today. I'm going to show you a picture that hasn't been finished. Then I'm going to show you two different ways it could be finished. I want you to pick the one that is the best way to finish the picture.

Sample Item

See Figure 7.

Table 8

Sample Music Composition Task

Target

Brief melody lacking an ending. Items were tape-recorded from a music synthesizer.

Correct Choice

Completion with balanced composition. E.g., the motive (or figure) of the first phrase is continued in the second phrase.

Incorrect Choice

Completion with unbalanced composition. E.g., the motive of the first phrase is not continued in the second phrase.

Procedure

(1) Target is played. (2) Target is played with either correct or incorrect choice added on. An audible click marks the ending of the target and the beginning of the choice. (3) Target is played with the other choice added on, divided only by the click.

Instructions

We are going to listen to some pieces of music today. You will hear the first part of a piece of music and two different ways it might end. I want you to pick the one that makes the best ending for the first part. We're going to listen to the music on this tape recorder. For each one, you'll hear the first part, then the first part with choice A added on, then the first part with choice B added on. You will hear a click on the last note of the first part so that you'll know where it ends and the choice begins. I want you to pick the choice that makes the best ending.

Sample Item

See Figure 8.

Table 9

Sample Literature Composition Task

Target

Story with beginning, middle, and no ending, abridged from published stories written for children, presented on audiotape.

Correct Choice

Completed story with resolved composition.

Incorrect Choice

Completed story with unresolved composition.

Procedure

(1) Target is heard. At the end of the target, one ending is heard, introduced as one possible ending. (2) Target is then heard again, this time followed by the other ending.

Instructions

We are going to listen to some stories today on this tape recorder. The stories are unfinished, and I'm going to ask you to pick an ending for each one. First you'll hear the beginning of a story, without an ending. Then you'll hear one possible ending, choice A. Then you'll hear the beginning again, followed by another way it could end, choice B.. I want you to pick the one that makes the best ending for the story.

Sample Item

See Figure 9.

Table 10

Tasks Administered in Each Condition

A. 1 Property, 3 Art Forms

Condition 1: Repleteness (D,M,L)*
Condition 2: Expression (D,M,L)
Condition 3: Composition (D,M,L)

B. 3 Properties, 1 Art Form

Condition 4: Drawing (R,E,C)**
Condition 5: Music (R,E,C)
Condition 6: Literature (R,E,C0

*D=drawing; M=music; L=literature.
**R=repleteness; E=expression; C=composition.

Table 11

Mean Scores (Out of a possible total of 6)

Age	C1 Repleteness D	C1 M	C1 L	C2 Expression D	C2 M	C2 L	C3 Composition D	C3 M	C3 L
7	2.8	3.4	3.2	3.8	3.9*	2.9	3.8*	3.6	3.4
9	3.5	3.7	4.3*	4.7*	4.5*	2.7	5.2*	3.9*	4.9*
12	4.4*	4.5*	5.2*	4.4*	5.0*	3.5	5.1*	4.3*	4.6*

Age	C4 Drawing R	C4 E	C4 C	C5 Music R	C5 E	C5 C	C6 Literature R	C6 E	C6 C
7	2.9	3.4	4.0	4.0*	4.5*	3.5*	3.1	2.9	3.7
9	3.9	4.3*	4.4*	4.3*	4.5*	4.1*	3.8	3.5	4.5*
12	4.8*	4.0*	5.1*	4.4*	4.7*	4.5*	4.9*	3.7	4.3*

*Mean above chance, $p < .01$.

Table 12

Percentage of Subjects With and Without Music Training
Who Attained Scores of 5 or 6 (out of 6)
on the Music Task

	Training					
	No	Yes	No	Yes	No	Yes
Age	Repleteness		Expression		Composition	
7	22%(27)*	33%(3)	38%(26)	75%(4)	18%(28)	0%(2)
9	41%(22)	50%(8)	41%(22)	75%(8)	35%(23)	57%(7)
12	55%(20)	70%(20)	68%(19)	82%(11)	56%(18)	42%(12)

* Numbers in parentheses are the numbers of subjects on which each percentage is based.

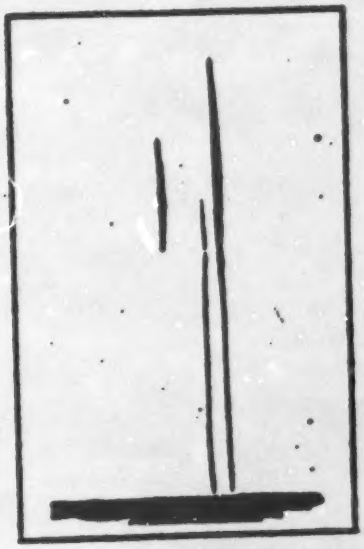
Figure Captions

1. Repleteness in Drawing: Sample Item
2. Repletness in Music: Sample Item
3. Repleteness in Literature: Sample Item
4. Expression in Drawing: Sample Item
5. Expression in Music: Sample Item
6. Expression in Literature: Sample Item
7. Composition in Drawing: Sample Item
8. Composition in Music: Sample Item
9. Composition in Literature: Sample Item

FIGURE 1

Repleteness in Drawing:
Sample Item

TARGET
Incomplete drawing, lines varying in thickness.



CORRECT
Line added, varying in thickness.

INCORRECT
Line added, uniform in thickness.

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FIGURE 2

Repleteness in Music:
Sample Item

TARGET

Changing dynamics loud to soft.

CORRECT

Changing dynamics loud to soft.

INCORRECT

Fixed dynamics uniformly loud.

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Figure 3

Completeness in Literature:
Sample Item

Target: (Rhyming)

Mother likes the frocks and hats
And pretty scarves and colored mats.

Auntie's fond of chains and rings
And all the sparkly diamond things.

Annie always loves to stop
In front of every single shop.

Correct: (Rhyme scheme continued)

Daddy likes machines the best.
He doesn't care about the rest.

Richard never never looks
At anything but maps and books.

Incorrect: (Rhyme omitted)

Daddy likes the big machines
He doesn't care about the rest.

Richard hardly ever thinks
Of anything but books and maps.

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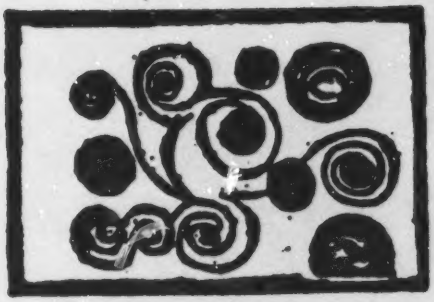
FIGURE 4

Expression in Drawing:
Sample Item

TARGET

Happy



CORRECT

Happy

INCORRECT

Sad

Figure 5

Expression in Music:
Sample Item

Target (Happy): Fragment from Spyro Gyra's "Morning Dance"

Correct (Happy): Fragment from Grieg's "Anitra's Dance"
Incorrect (Sad) : Fragment from Pachelbel's "Canon"

Figure 6

Expression in Literature:
Sample Item

Target (Calm)
There is a place where the sidewalk ends
And before the street begins,
And there the grass grows soft and white,
And there the sun shines crimson bright,
And there the moon-bird rests from his flight
To cool in the peppermint wind.

Choice A (Excited)
A train is a dragon that roars through the dark.
He wriggles his tail as he sends up a spark.
His pierces the night with his one yellow eye,
And all the earth trembles when he rushes by.

Choice B (Calm)
Little snail,
Dreaming as you go,
Weather and rose is all you know.

Weather and rose
Is all you see,
Drinking the dewdrop's
Mystery.

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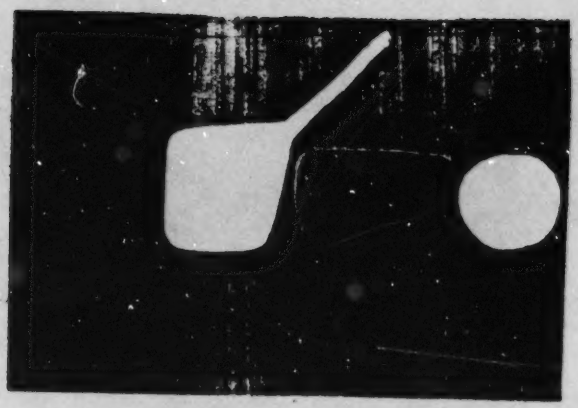
FIGURE 7



TARGET

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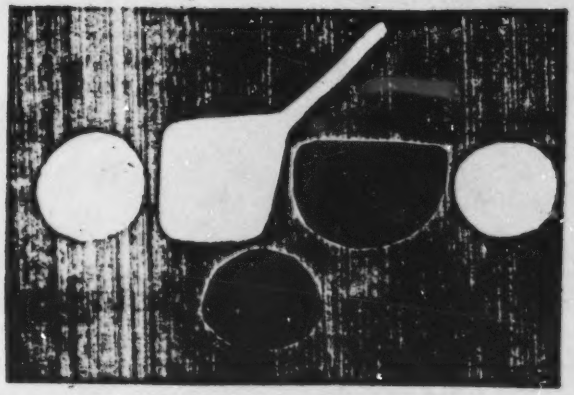
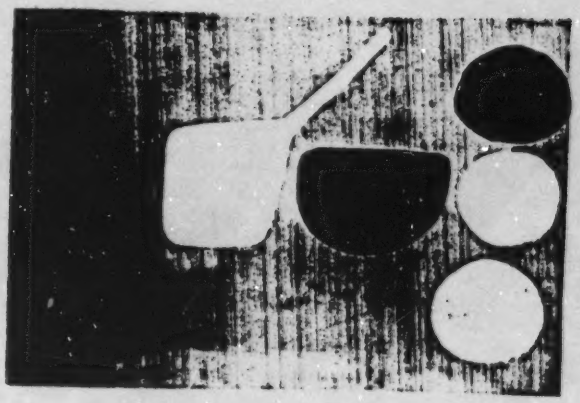


CORRECT



INCORRECT

FIGURE 8

Composition in Music:
Sample Item

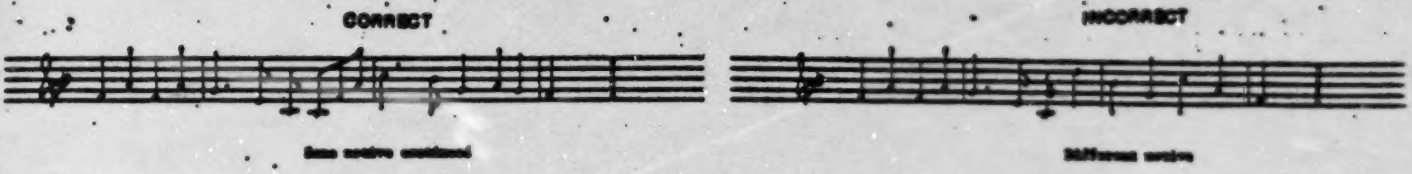


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Figure 9

Composition in Literature:
Sample Item

Target (Conflict introduced)*

Once, a long time ago, there was a lion who was King of the Forest. Every day he hunted for an animal to eat for his dinner, and all of the creatures of the forest lived in fear that the lion wa prowling nearby. The animals could not go anywhere without being afraid that the lion was out hunting. But one day the Lion decided that he was tired of hunting for his food. He called all of the forest creatures to him and told them that he had worked out a new plan. Every morning at daybreak one of the animals was to present himself to the lion to be killed and eaten. The animals were to draw lots to decide which one it would be. Thus, the lion didn't have to bother to hunt and the animals were free to roam the forest without fear.

This plan worked for a while. Then one evening the lot fell upon the Rabbit. Now Rabbit was quite determined not to be the Lion's breakfast the next morning. The other animals were sorry that it was Rabbit's turn because everyone liked Rabbit. But if they broke their agreement with the Lion, it would be worse for everyone because the Lion would then become angry and start prowling the forest again. Everyone wished that Rabbit could be saved and that they could be rid of the tyrant the Lion.

Correct Choice (Conflict resolved)

That night Rabbit stayed awake, trying to think of a plan. The next morning, it was well after daybreak when Rabbit arrived at the lion's den. The lion was very angry that Rabbit was late, because he was quite hungry. Rabbit said he was sorry, and that he was late because he had met another lion on his way who had wanted to eat him. This other lion told Rabbit to tell everyone that he was the true King of the Forest and that he was going to drive out any animal who dared to disagree.

Hearing this story, the lion was furious. He demanded that Rabbit take him to this other lion, so he could show him who was really King of the Forest. So Rabbit set off with the Lion following behind. After a while, Rabbit whispered to be careful because they were nearing the other lion's den. Actually, they were approaching a deep well. Rabbit looked down into it and saw his own small face reflected back. Then he stepped back and told the Lion to look down and see the other lion who wanted to be King. The Lion scowled angrily and went to the edge of the well to look. He saw the angry face of a lion staring back at him. He leaped at the enemy, struggled for a short while, and then drowned. Rabbit joyfully hurried back to tell the other creatures that the Lion was dead and that they no longer had to be afraid.

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Incorrect Choice (Conflict not resolved)

That evening Rabbit decided to fix up his rabbit hutch. First of all, he wanted to make it bigger. Since his home was really a hole in the ground, the way to make it bigger was to dig. So he dug on both sides to make it wider. Then he went to the back and dug some more until was longer. All this digging made big piles of dirt in the middle of the floor, so Rabbit got his children to gather all the loose dirt together and push it out the door. Then he wanted to pack the walls and the floors so they would be nice and smooth. He called his family back in and showed them how to push with their noses and tap with their feet to pack the dirt down.

By now, the soft grass beds that the rabbits slept on were squashed flat and full of dirt. So they all went out to find some new grass. The field they lived in only had stiff, stubbly grass, so, being careful to avoid the lion's den, they went down to the edge of the river where the grass was long and soft. They worked for a long time, nibbling at the stalks of grass and gathering them into small bundles. Then each of them took a bundle in their mouth and they hopped back home. They made soft beds out of the fresh, new grass. And by the time they were done, they were so tired that every one of them curled up on a nice new bed and fell asleep.

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